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Soil & Water Conservation News

Agency Heads Speak at SCS Conference

Heads of three agencies of the U.S. Department of Agriculture were among the speakers at the Soil Conservation Service (SCS) National Conference held in Rapid City, S. Dak., September 22-26, 1980. Another key speaker who addressed the meeting was Lyle Bauer, presi-

dent of the National Association of Conservation Districts (NACD).

A theme common to each of the speakers was one of cooperation. As Ray Fitzgerald, administrator of USDA's Agricultural Stabilization and Conservation Service (ASCS), expressed it: "The 'C' in both ASCS and SCS stands for 'conservation'—but, to me, it also has a second meaning that, given the nature of the missions of our agencies, is only a little less important: 'cooperation.' I cannot stress strongly enough what I have always believed in and worked toward: the very real importance of a joint effort between us to achieve common goals."

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Anson R. Bertrand, director of USDA's Science and Education Administration, contributed a strong statement that "the successful and productive interaction of soil and water conservation research and soil and water conservation technology is our last best hope to meet the tremendous pressures that are being placed upon our land resource base. These pressures include the expansion of our agricultural export trade, the conversion of prime agricultural land to urban use, and the competition for water."

R. Max Peterson, chief of USDA's Forest Service, reached back into

Continued on next page.

The 1982 National Resources Inventory Now Underway

by Jerry S. Lee

The 1982 National Resources Inventory (NRI) being conducted by the Soil Conservation Service (SCS) is the most comprehensive natural resource inventory ever undertaken by the agency.

Data will be collected at 350,000 sampling sites throughout the country with statistical reliability down to the level of the major land resource area.

Data collected during the 1977 NRI included land capability class and subclass, land use, rates of water and wind erosion, acreages of prime farmland, potential cropland, types 3 to 20 wetlands, and irrigation land.

Among the new data to be collected for the 1982 NRI are windbreaks, critically eroding areas, irrigation, cropping history, land cover, additional information on wetlands, riparian vegetation, wildlife

habitat, additional information on soils, and supplemental vegetation data on pastureland, rangeland, and forest land.

Inventory techniques for the 1982 effort will consist primarily of field observations that will be recorded on an aerial photograph base map. From this base, a monitoring methodology will be developed that is consistent with current technology. This will include use of photointerpretation techniques, satellite data collection systems, in-place sensors, and mechanized scanning.

Each of the sample points will be identified in a way that will allow access to a computerized soil information file. This access will allow detailed analyses of soil suitabilities and limitations and potentials for a wide variety of land uses.

As with the 1977 NRI, the inventory data and analyses are required because of legislation: The Rural Development Act of 1972 requires a report on the status, condition, and trend of land and water resources; the Soil and Water Resources Conservation Act of 1977 requires a con-

tinuous appraisal of soil, water, and related resources including fish and wildlife habitat; and the Surface Mining Reclamation and Enforcement Provisions of 1977 require prime farmland identification before planning, mining, and reclamation.

An important value of the SCS monitoring activities will be their integration with other data for prediction of phenomena. For example, integrating climatic data with soil moisture data for benchmark cropland soils would enable predictions of the probability and severity of drought, wind erosion, or flooding.

According to a statement by SCS Chief Norman A. Berg at the SCS National Conference, the 1982 NRI is a top priority item for the agency. He says that the NRI and other agency inventories "are indispensable tools in planning and making land use decisions. They also provide the basis for requesting the money and people-power needed to get the conservation job done."

Jerry S. Lee,
director, Inventory and Monitoring,
SCS, Washington, D.C.

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Agency Heads Speak, cont.

history to suggest "we take some advice from early leaders in the conservation field such as Gifford Pinchot, the first chief of the Forest Service. He said, 'To achieve any great result, straight thinking and strong action are necessary, and straight thinking comes first.' Or as Hugh Bennett [the first chief of the Soil Conservation Service] might have said, 'Think straight, but plow on the contour.'"

Peterson went on to conclude that "we are urged to think straight, take strong action, and convince those we serve that our programs are sound and deserve support. Our efforts to work together to coordinate our plans show we are serious about doing this. We know there is more strength together than as individual agencies.

"And we know if we don't measure up to the challenges before us, we can't keep it secret. It will show in the faces of those generations to come. Either these people come of age in a land of scarcity or a land where the natural resource supply is sufficient to uplift the quality of their lives."

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Bauer went on to say that he thinks SCS "needs a new plan of action, as an agency . . . that sets out where you want to go, and what you want to be, by 1985, and beyond."

He further stated, "I strongly believe we need a dynamic, effective national technical agency to make our total effort strong. SCS has always been that agency, and I think district officials all across America feel you should stay that way."

In his concluding remarks, Bauer said, "We need to continue to remind ourselves why we are all here in the first place. I've talked mainly today about how we can get our act together more effectively, and those things are important. They are important because they will help us get conservation on the land. That is what we're in this conservation business for, and we mustn't forget it. We face some difficult times in the future, according to every forecast I read. The conservation program is a vital national 'insurance policy' for keeping our Nation strong and productive."

NACD President Lyle Bauer, in addressing the attendees, issued strong challenges and posed thought-provoking questions, not only to SCS but also to the other agencies represented at the meeting. He, too, underlined the need for cooperation when he said that he and SCS Chief Norm Berg "see NACD and SCS as a team, and as the leaders of the two different parts of that team, we are dedicated to keeping our combined efforts on track.

"We are in the midst of a period of intense growth and change in the conservation program, and any period like this is accompanied by a great deal of anxiety and stress. It is important that we not let ourselves become so engrossed in the problems of change that we do not look for the opportunities that it brings, as well. We need to be very certain of our mutually agreed to directions and policies, so that we can guide the inevitable changes that are affecting districts and your agency now, and that will affect them even more in the future."

the thinking of many SCS employees. Our 1982 budget request reflects some of this thinking in its references to a number of the resource areas and alternative strategies developed in the 1980 RCA process. These include:

- Targeting our resources to reduce erosion in critically eroding areas and on fragile soils;
- Improving water quality and water conservation;
- Developing more nonstructural alternatives to reduce upstream flood damages;
- Preserving wetlands and wildlife habitat; and
- Conserving energy.

The 1980 RCA process unearthed

an amazing amount of data—facts and figures about every aspect of our Nation's soil, water, and related resources. All this information was open to public scrutiny and comment.

The thousands of concerned citizens who took the time to respond to the RCA effort are most interested in programs for erosion control, prime farmland retention, conservation tillage, and drainage. They are least interested in programs for wetlands retention and data collection.

What these comments boil down to is widespread support for a voluntary, locally controlled, but Government-subsidized program. Whether or not this is the program that emerges remains to be seen. But decisionmak-

RCA Update

The following are excerpts from the Annual Message delivered by Norman A. Berg, Chief of the Soil Conservation Service, at the SCS National Conference in Rapid City, S.Dak., on September 22, 1980:

For more than 2 years, many in SCS have been involved in meeting the challenges of the Soil and Water Resources Conservation Act of 1977 (RCA). We have put in countless hours, and, before the 1985 effort is completed, we will undoubtedly put in many more.

The fresh ideas and new directions developed through RCA have altered

Bob Bergland
Secretary of Agriculture

Norman A. Berg, Chief
Soil Conservation Service

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Comments: *from the SCS Chief*

The following comments are excerpted from the annual message of Norman A. Berg, Chief of the Soil Conservation Service, given at the SCS National Conference, Rapid City, S. Dak., on September 22, 1980:

The professional public manager today cannot afford to be provincial about his own organizational unit; he needs to work closely with other professional managers across organizational lines and understand their points of view. We can all benefit by building on common goals, better communications, and mutual support for one another.

Besides improving relations with other Federal agencies, another top priority is to build cooperation with a broad spectrum of non-Federal organizations, with interest groups representing agriculture, conservation, the environment, and local and State governments.

It will take the efforts of each Service employee to carry out our mission. It makes no difference whether a job is in engineering or in contracting, in secretarial work or in soils, in personnel classification or in agronomy—each job effectively done is necessary for our agency to function properly.

Many of us chose careers in public service because we believe in the capacity of government to make this a better world. As we care about the success of government, we must work on the problems of serving the public well.

In a way, it is a tribute to our agency and its record of achievement over the years that our friends in Congress and in rural America continue to make demands upon us. They evidently think we can deliver the goods. I don't think we'll disappoint them.

I think that people can make any organization work, but good organization and good people are a winning combination. That is what we have today in the Soil Conservation Service!

It is the role and responsibility of every employee—in whatever location and whatever position—to make certain that the Soil Conservation Service is continuously renewed and that the things we do continue to further the cause of conservation. I count on each of you to do that—and not a bit less.



ers are taking the public's comments into consideration in developing the final program.

The recommended USDA program should go forward to the President and to the Congress early in 1981. Before that happens, though, there will be another 60-day public review period.

Many of the ideas developed in the RCA process are already firing the

imagination of lawmakers and others.

Such basic questions are being explored as: What is the impact of erosion on yields and ultimately on our ability to produce food and fiber? What is the appropriate share of the total conservation cost that should be borne by the public versus that of the land user? What is the direct relationship between soil conservation and water quality? These fundamental

questions are being examined in and out of SCS, and they need to be answered soon. The public demands it. They are interested in all of these issues . . . and many more.

The program that finally emerges from the RCA process should not be limited to only one concern—the land and its ability to produce. It should encompass all natural resources.

News Briefs

New Act Promotes Fish Farming

The National Aquaculture Act of 1980, recently signed into law, calls for setting a national aquaculture policy; making and carrying out a national aquaculture plan; and encouraging public and private aquaculture activities, programs, and studies.

The act authorizes funds to support aquaculture research, development, and technology transfers among the Departments of Agriculture, Commerce, and Interior.

In guiding the U.S. Department of Agriculture's aquaculture activities, Secretary Bergland has issued USDA's aquaculture policy (Memorandum No. 2018) and an open-ended plan titled "Aquaculture: A Program for the Eighties." He has also established the USDA Aquaculture Coordination Committee and called on the Soil Conservation Service to increase its technical assistance to aquaculturalists.

Six New Watershed Projects Approved for Assistance

The U.S. Department of Agriculture has approved six new watershed projects for planning assistance in Alabama, California, Maine, Oklahoma, Washington, and Wisconsin.

Norman A. Berg, Chief of USDA's Soil Conservation Service, says SCS will provide technical assistance to local sponsors of the six projects. Assistance includes onsite investigations and resource surveys needed for developing watershed plans under the Watershed Protection and Flood Prevention Act of 1954.

Berg says the six projects will protect the watersheds they serve from erosion and siltation and help prevent flooding.

Maryland Farmer Receives First Check Under Rural Clean Water Program

The first cost-share payment under the \$50 million experimental program to clean up the Nation's streams and lakes was made recently to a Maryland farmer by Ray Fitzgerald, administrator of the U.S. Department of Agriculture's Agricultural Stabilization and Conservation Service (ASCS).

Fitzgerald presented a check for \$8,953 to Parker Smith, of Carroll County, to help share the cost of building an animal waste facility to prevent runoff from Smith's dairy operation. Fitzgerald presented the check to Smith while touring the project site.

Smith is one of 290 Maryland farmers expected to take part in the Double Pipe Creek rural clean water project in Carroll County. The Government's share of the entire project will be nearly \$4 million, Fitzgerald said. Double Pipe Creek is located in a 100,000-acre watershed in Carroll County.

The Double Pipe Creek project is one of 13 such projects being financially assisted under the program.

In addition to the Carroll County project, signups are underway for other experimental rural clean water projects approved in the following 12 States: Alabama, Delaware, Idaho, Illinois, Iowa, Kansas, Louisiana, Michigan, Tennessee, Utah, Vermont, and Wisconsin.

Fitzgerald said farmers who are interested in participating in the program should file requests with their

county ASCS office. Soil Conservation Service personnel will then develop a water quality plan which is presented to the local soil conservation district. The county ASC committee then approves the plan and signs a contract with the farmer, Fitzgerald said.

Farm Progress Show Features Conservation

More than 300,000 people visited the agricultural exhibits and demonstrations at the Farm Progress Show sponsored by *Wallace's Farmer* near Nevada, Iowa, this fall. During the 3-day show, 1,200 acres of corn and soybean test plots were harvested.

The Soil Conservation Service, the Iowa Department of Soil Conservation, and soil conservation district commissioners planned and managed six conservation tillage demonstration plots and a farmstead windbreak for the show. The conservation tillage plots were a big attraction, and most of the farmers who stopped at the exhibit were surprised to see no problems with weeds or insects. Farmers asked many questions about weed control, insects, yields, and possible trash buildup with conservation tillage. SCS employees were on hand to answer their questions.

An exhibit run by the district commissioners also drew lots of attention. People stood in line to spin the conservation wheel. If the wheel stopped at "no-till," they won a prize.

The Farm Progress Show is an annual event in the Midwest, and the show rotates among Iowa, Illinois, and Indiana.

SCS Streamlines Its National Office

The Soil Conservation Service's National Office completed its reorganization in May. Under the reorganization, the title of SCS administrator has been changed to chief and associate administrator to associate chief. Four of the five assistant chiefs

supervise the four Technical Service Center directors, and they all work with the 51 SCS State conservationists.

The six deputy chiefs providing National Office staff support report directly to the chief, as do the heads of

special staffs. Leaders of other National Office activities report to one of the deputy chiefs.

The chart below illustrates the reorganization.

Office of the Chief

Administers a national program for soil and water conservation, directs all SCS programs, provides leadership in USDA on soil, water, and related conservation matters.

Deputy Chiefs

Administration

Develops national policy and provides agency leadership in administration, including administrative services, personnel, financial management, and management services.

State and Local Operations

Provides leadership for national, state, and local programs, including conservation planning and application, land treatment, rural development, and land use.

Natural Resource Projects

Develops policy and provides leadership in projects concerning watershed protection, flood prevention, river basins, resource conservation and development, and water quality.

Technology Development and Application

Provides agency leadership for technical services in ecological sciences, economics, engineering, social sciences, foreign activities. Identifies research needs.

Natural Resource Assessments

Provides leadership for all programs dealing with natural resource assessments, including soil surveys, inventory and monitoring, information systems, snow surveys, and cartography.

Planning and Evaluation

Provides agency leadership for program planning, policy analysis and evaluation activities, budget formulation, and program evaluation. Includes RCA leadership.

Assistant Chiefs

Represent the Chief in designated geographic areas of the United States; help develop national policies; provide leadership and guidance to state conservationists and their staffs; supervise technical service center directors; represent designated area for overall agency planning, budgeting, reorganizing, staffing, and reviews.

Assistant Chief Areas



Technical Service Center Directors

Provide assistance to state conservationists and their staffs in administration, conservation and planning technology, engineering, soils, water supply forecasting, employee development, cartography, and public information.

Technical Service Center Areas



Special Staffs

National Office Administrative Support

Provides administrative support for the National Office staff in such areas as personnel, financial management, office space, procurement, and contracting.

Office of Equal Opportunity

Establishes and monitors agencywide equal opportunity programs, assures agency compliance with civil rights laws, provides leadership and training.

Legislative Affairs

Coordinates legislative affairs of the agency, including developing policy and procedures, monitoring Congressional activities, answering Congressional requests.

Information and Public Affairs

Provides a program of information support and public affairs activities, including policy input, media liaison, publications, and audiovisual services.

Public Participation Coordinator

Provides agency leadership in public participation matters, including developing policy, to give all publics access to agency decisionmakers.

Environmental Coordinator

Coordinates environmental quality goals in all SCS programs and activities. Represents agency on environmental policy matters, guides environmental assessments.

Conservation Demonstrations

Thousands Ride the Conservation Trail at Plowville, U.S.A.

Conservationists worked for most of a year to make Paul Holmgren's Swanville, Minn., farm a showplace of conservation in time for the big Plowville, U.S.A., event, which was held at Swanville last July.

Plowville featured the State and national plowing contests as well as contests with antique plows and demonstrations of plowing with horse and oxen.

On Holmgren's farm, across the road from the plowing matches, the conservationists built terraces, a runoff-controlling diversion, and a wildlife pond with almost every imaginable kind of nesting and feeding structure. They planted trial plots of oats, tried different techniques of seeding and weed control on a pasture, planted corn with five different tillage systems, and laid out

Holmgren's fields in contour strips.

They prepared a tour route and conducted a few dry runs just to make sure all was ready. Six implement dealers were contacted and each provided a tractor to pull tour wagons. Tour brochures were printed. Experts from various fields of conservation were lined up to explain the tour stops. The Minnesota National Guard built a bridge so the tour could cross a stream that runs through the farm. Tractor drivers were briefed.

It was one of the most elaborate displays of conservation ever set up in Minnesota. And now it was ready.

The first morning of Plowville came and by 10 a.m. four wagons were out on the tour. Before the weekend was through, 105 wagons carried nearly 3,000 people on the conservation tour. It was more successful than the most optimistic people on the planning committee expected.

First stop on the 2-mile trip was a

demonstration of conservation tillage. Five, quarter-acre corn plots provided a comparison of growth rates, residue cover, weed control, and soil moisture and fuel saving potential of various tillage methods. The tillage methods ranged from a conventional system of plowing, disking, planting, and cultivating the field to planting with no tillage at all. The purpose, according to Soil Conservation Service personnel who prepared this part of the demonstration, was to prove that all the traditional field operations aren't necessary to grow a good corn crop. The corn would grow just as well in fields covered with residue as in those that are plowed black, and the risk of soil erosion would be much less.

The next stop was a half-acre plot that featured eight varieties of oats. Some were on the University of Minnesota's recommended list and others were not. The purpose was to compare protein content, disease re-

Emphasize the "Progress" in Ag Progress Days

Each year since 1978, Pennsylvania farmers have had an opportunity to learn more about soil and water conservation practices during Ag Progress Days, an annual event held on The Pennsylvania State University's (PSU) Research Farm at Rock Springs.

In 1978, 80 acres of the research farm was designated to be turned into a conservation research-demonstration farm to: (1) demonstrate the latest in natural resource management; (2) develop an area of natural resource conservation research; and (3) train PSU students in soil, water, woodland, and wildlife management.

The Ag Progress Days Conserva-

tion Education Committee met with the Pennsylvania Chapter of Land Improvement Contractors of America (PLICA) who agreed to participate in the project. Under the direction of former Soil Conservation Service District Conservationist Pat Partenheimer, SCS conservationists and PSU agricultural engineers developed a conservation plan for the area.

Installation of the planned conservation practices is limited each year to the 3 days of Ag Progress Days. The use of more than \$1 million worth of earthmoving equipment is donated each year to construct the conservation measures. PLICA members donate their time to operate the equipment and associate PLICA members provide materials without

charge or at greatly reduced costs. USDA's Agricultural Stabilization and Conservation Service provides cost-share funds to encourage the installation work.

SCS and PSU personnel supervise construction and talk with the thousands of people who visit the area each year.

The area is used year round by the PSU agronomy, agricultural, engineering, and environmental education departments as a teaching area; by SCS to train employees; by conservation product manufacturers to demonstrate their new products for erosion control; and by PSU and others to carry out soil, woodland, and wildlife conservation research.

During the first year of the demonstration project, a stone waterway,

sistance, yield, maturity rate, and other factors.

The tour wagon rolled on to a waterfowl pond built by the Minnesota Department of Natural Resources. The pond is somewhat unusual for a constructed project because the edges are irregular. This provides a more natural appearance and more nesting cover along the edges. Several kinds of floating and mounted feeders and nesting structures were on display in and around the pond.

From there, the tour wagon rolled on to Holmgren's pasture where the University of Minnesota Extension Service had experimented with several techniques to improve forage production and weed control.

The wagons then headed for the hilly parts of the farm where several methods of erosion control had been built. Alternating strips of corn and oats, a grassed waterway, three terraces, and a diversion were all working together to control runoff and

thereby minimize erosion on the fairly erosive sandy soil.

These practices were installed with 75-percent cost sharing from USDA's Agricultural Stabilization and Conservation Service and the Todd County Soil and Water Conservation District.

All the highlights along the tour were well marked with signs. The wagons stopped at each site and the riders received a short explanation of what they were looking at and had their questions answered.

The conservation demonstration was planned and produced by the Soil Conservation Service, Agricultural Stabilization and Conservation Service, University of Minnesota Extension Service, Minnesota Department of Natural Resources, the Morrison and Todd County Soil and Water Conservation Districts, the Minnesota Soil and Water Conservation Board, the Minnesota Association of Soil and Water Conservation Districts—and of course, Holmgren.

For Holmgren, the conservation will stay on the land long after the tracks of the conservation tour wagons disappear. A cooperator with the Todd County Soil and Water Conservation District, he plans to keep the erosion controls and pasture management as a regular part of his farm operation. He hopes now that the crowds are gone that several species of wildlife will take advantage of the food and cover that the new pond provides. He also says he will analyze the results of the five tillage methods and use the one that seems to provide the best yield while conserving soil, moisture, and fuel.

Tom Gahm,
public information officer,
SCS, St. Paul, Minn.

drop structure, drop inlet structure, stormwater retarding dam, and subsurface drains were established. The next year, additional tile and stone waterways, diversions, a gabion mattress, and a grouted concrete mattress were installed. This year, underground drains and parallel tile outlet terraces were installed. State agencies and university staff began developing wildlife and woodland management areas.

In future years, bench terraces, ponds, more diversions and subsurface drains, woodland erosion control practices, and wildlife management areas will be completed.

Interest in the area continues to grow. Heads of agricultural industries and members of the Pennsylvania legislature have visited the site, and

Pennsylvania's Governor Dick Thornburgh joined PSU officials in a tour of the area.

PLICA Executive Secretary V. C. "Corky" Miles said, "The project is good for all concerned. From PLICA's standpoint, it has given conservation contractors good exposure, and it has given them the opportunity to try new equipment on the job. Most important is the fact that it has improved working relationships among PLICA, PSU staff, SCS, and other conservation groups."

According to Graham T. Munkittrick, SCS State conservationist for Pennsylvania, "Demonstrations of this type serve many purposes. They allow the farmer to see firsthand what soil and water conservation practices are and how they are constructed;

they are educational because some of the practices are new to the State; and they promote better relations. For example, our relationship with the university and groups such as PLICA and the Pennsylvania Aggregates Association is greatly improved. In addition, SCS received exposure through radio and TV coverage and local and national magazines. All of this results in a better public understanding of the soil and water conservation program and the benefits of long-term resource management."

Frederick E. Bubb,
public information officer,
SCS, Harrisburg, Pa.

Windbreaks Move to Urban America

by J. K. Obatala

On a windy day in 1932, President Franklin D. Roosevelt's train was delayed by a dust storm near Butte, Mont. Surveying a bare hillside, he asked his aides why trees couldn't be planted to make the place more livable.

That query led to the creation of the Prairie States Forestry Project and other programs designed to help midwesterners realize the full benefit of trees.

Now, nearly 50 years later, urban America is learning a similar lesson from the rural Midwest: That trees, planted for windbreaks, can make homes more "livable"—and more energy efficient.

Windbreaks have long been used in the Midwest to save up to 35 percent on the cost of heating farmsteads, but their application in urban areas is a relatively novel concept. It is based largely on research conducted by the Consortium for Environmental Forestry Studies—a project sponsored jointly by USDA's Forest Service and 12 major universities.

Experiments conducted at Princeton and Pennsylvania State Universities in 1975 and 1977 show that urban windbreaks can produce substantial savings in heating fuel costs.

At Princeton, triangular wire screens, designed and arranged to simulate a single row of conifers, were placed around models of townhouses of equal height in a wind tunnel. The result was an estimated 13-percent reduction in heating fuel use when winds were from the protected direction.

When the model included a 5-foot-high wood fence between the trees and the house, savings increased to 20 percent. Researchers point out that dense hedges would probably serve as well or better than a fence.

In another Princeton experiment, this time at full scale, a row of 10, 25-foot, cut white pines was placed on the windward side of a townhouse for 9 weeks. Researchers collected data, from which they projected a 40-percent reduction in infiltration of

cold air into the house during times when wind was from the direction protected by the windbreak and a 3-percent reduction in energy use for the winter.

Encouraging results were also obtained at Pennsylvania State University, where experimenters placed a camper-trailer in a pine forest. They predicted a 9-percent savings in winter fuel consumption, for a properly placed windbreak that did not shade the trailer in winter.

Windbreaks reduce air infiltration—which is responsible for a third of the energy expended in heating buildings—by slowing the speed of winds and distributing cold air more evenly around protected structures.

It should be noted, however, that not all homeowners benefit equally from windbreaks. "The effectiveness of windbreaks varies," says Gordon M. Heisler, research meteorologist for the Forest Service and a member of the Consortium at Pennsylvania State University.

"If your house is well insulated or surrounded by tall buildings or trees,



Trees not only beautify neighborhoods, they also can help homeowners save money by reducing home heating and cooling bills.

Deciduous Trees Add to Energy Savings

Deciduous trees, planted at critical spots around the home, can reduce summer cooling costs by shading out solar radiation heat. This helps to reduce temperature differences between the inside and outside surfaces of buildings, thus less air conditioning is required.

"Much less is known about the energy savings potential of trees in summer than in winter," says Howard Halverson, project leader of the

you will benefit less from a windbreak than say, a person who lives in a relatively open area or a loosely constructed home."

Yet a carefully designed and maintained windbreak can yield energy savings of 10 to 15 percent for many urban homeowners. Designers should consider climate and terrain, as well as the speed and prevailing direction of winter winds.

"It is difficult to advise homeowners on where to locate their windbreaks," says Heisler, "since wind direction is highly influenced by local conditions. While winter winds tend to be northerly and westerly in Pennsylvania, that may not be true of other States—or even in all of Pennsylvania."

Heisler and others agree that a good way to determine where to locate windbreaks is to watch the direction of falling snow or the movement of tree branches on windy days.

Windbreaks should be located upwind from the home, at a distance not closer than the expected maximum

height of the trees. Otherwise, tree tops could shade out sunlight and increase winter energy consumption.

The selection of trees is also important. It should be governed by the specific needs of the homeowner. Factors to be considered are legal restriction on planting, space limitations, climate, species availability, cost, soil composition, the desired rate of growth, and the disease resistance of various species.

Trees selected for windbreaks should have good strength characteristics and be relatively fast growing. Various species of spruce and pine have been tested in the East and found to be quite adequate.

"Almost any conifer will provide a reasonably good windbreak," says Heisler, "as long as it has a crown that extends down to the ground and appears to be fairly dense."

Gary Moll, urban forestry coordinator for the Maryland State Forest Service agrees. He insists, nevertheless, that homeowners "make every effort to select the species best suited for their particular

climate and soil conditions."

Moll leans heavily toward the pine group. "White pine is a hardy species," he says, "which will grow vigorously in good soil as well as in the more sandy areas of the Northeast."

"However, homeowners in western Maryland and other sandy areas farther North, might want to consider red pine, which is especially suited for that type of soil and climate."

For the Southeast, Moll recommends the standard short and long leaf pines, along with loblolly pine. "These species are excellent for windbreaks," he said, "though Carolina hemlock also grows well in that region—as does its Canadian counterpart in the Northeast."

Trees for use in windbreaks may be purchased in most commercial nurseries. Buyers may choose from seedlings, transplants, container grown trees, or trees left in a ball of soil and wrapped in burlap (B&B).

Seedlings grow slower and cost less. While container and B&B plants cost more, they also become estab-

Continued on next page.

Northeastern Forest Experiment Station research unit in State College, Pa. "But we are quite certain that substantial savings are possible."

In New Jersey, for example, experimenters observed a 9° C (16° F) difference between the tree-shaded and unshaded portions of exterior surfaces of a wood-sided home.

Although statistics are scanty, estimates of possible summer savings range as high as 75 percent.

This, in fact, was the result of an experiment conducted in Pennsylvania, where researchers placed a camper-trailer in a grove of tall deciduous trees. The roof of the shaded

trailer, they found, received only one-tenth of the solar radiation it received when exposed to the sun.

"The advantage in planting deciduous trees," says Ken Cordell of the Southeastern Forest Experiment Station and a project leader in Athens, Ga., "is that they lose their leaves in winter. For that reason, they can be planted close to the house, without blocking out sunlight during the cold season."

Specialists generally agree that homeowners can benefit significantly from planting trees for shade. However, due to the wide variety of available species and a lack of conclusive

data, most are reluctant to make specific recommendations.

Instead, they suggest that homeowners consult the Soil Conservation Service or other specialists concerning species that grow well in their area. "Beyond that," says Gary Moll, urban forestry coordinator for the Maryland State Forest Service, "the homeowner should be guided by his or her own taste in color, shape, and height and preferred rate of growth."

J. K. Obatala.
writer, formerly of Information and Public Affairs
SCS, Washington, D.C.

lished and grow more rapidly. Transplants are generally somewhere in between these, both in growth rate and price range.

The preparation and maintenance of the planting sites are important parts of constructing a windbreak. Robert Hartung, national forester for the Soil Conservation Service, recommends that a soil test can be helpful to determine whether acidity and nutrient levels should be adjusted for proper plant rooting and growth.

"Advice concerning the application of lime and fertilizer will accompany the test," he says. "This could be critical to the success or failure of a windbreak project."

Competing vegetation, such as grass, weeds, or woody plants should be eliminated from the site. This can be achieved by cutting, cultivation, herbicidal treatment, or a combination of these.

Hartung and other specialists agree that one or two rows of conifers can be quite effective. While three-, four-, or five-row windbreaks are

more effective, the energy benefits do not increase in proportion to the number of trees planted.

Specialists also recommend that the outside rows—both downwind and upwind—be trees with dense, low growth. A row of fruit or berry-bearing shrubbery might be added to enhance the wildlife habitat and esthetic value of the planting.

The inside or "core," they note, normally consists of faster, taller growing trees, such as red, white, or Austrian pine or hemlock.

After the windbreak has been planted, proper maintenance is necessary to secure the homeowner's investment and insure maximum effectiveness.

"It is especially important," write Pennsylvania State Consortium members David R. DeWalle and Edward P. Farrand, in *Windbreaks and Shade Trees*, "to protect the lower branches from injury or stunted growth. Exclusion of pets, livestock, and children may be necessary while trees are getting started."

DeWalle and Farrand recommend

pruning as the trees grow. Multiple tops should be cut, they say, so that only a single terminal leader is left growing up from the top of the tree. Apparently, multiple tops make trees more susceptible to damage during ice and snow storms.

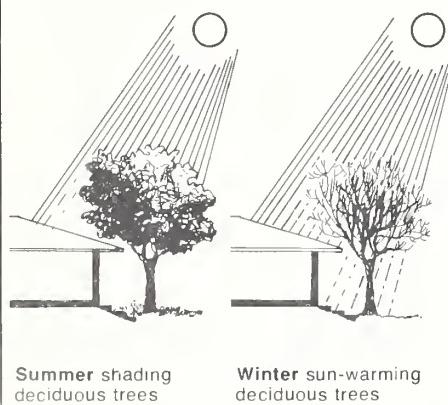
Fertilizer may also be needed, they say, if the trees do not show normal to vigorous growth. It should be applied 1 year after the planting, preferably in March or early April.

Assistance in planning and constructing windbreaks is available from the nearest SCS, conservation district, or County Extension office.

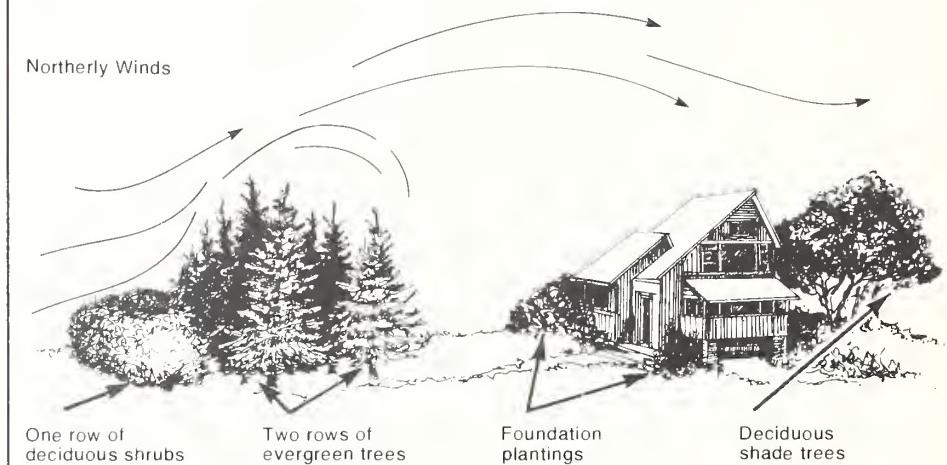
In the meantime, homeowners should be aware that a windbreak is an investment in the future—not a purchase of immediate energy-saving capacity. Trees must reach half the height of the house, specialists say, before the windbreak begins to yield significant returns on dollars invested. On average, they estimate, this takes about 5 years.

J. K. Obatala,
writer, formerly of Information and Public Affairs,
SCS, Washington, D.C.

Deciduous trees can cut energy costs by shading homes in summer and letting the sun warm homes in winter.



Well-located trees and shrubs can intercept the wind and cut a home's heat loss. Two- to five-row windbreaks generally provide good protection. Foundation plantings help cut heat loss by creating a "dead air" space which slows the escape of heat from a building.



Faster-Growing Windbreaks

by John H. Sautter

A Nebraska family has found a way to cut 3 years from the growth time for a new windbreak. The Louis Halstead family, who have a combination farm and ranch in Logan County, developed a windbreak in 12 years rather than the normal 15 or more years.

"When we took possession of the land in 1966," Louis explained, "we knew the place needed a farmstead and feedlot windbreak for protection. A good windbreak would also improve the looks of the place and save energy."

"The spring after we moved in, I contacted the Soil Conservation Service for some planning assistance. Their recommendation was to summer fallow the ground the year before the windbreak was to be planted."

"We rigged a toolbar with three, 24-inch sweeps to summer fallow the ground. This prepared an area 6 feet wide for each row of the new windbreak. Space between the rows was figured at about 20 feet and marked so we knew where to till the ground," Louis said. The space not tilled was kept mowed with a shredder to control the growth of grass and weeds.

With assistance from SCS, the windbreak plan was developed with a north-south belt of trees west of the feedlot area, and an east-west belt of trees north of the house and feedlot. Trees selected for the windbreak were eastern redcedar, ponderosa pine, and Siberian elm. These species are adapted for a silty soil windbreak site like the Halstead's. Design plans called for two rows of cedar on the north and west, then a row of pine, another row of cedar, with two rows of elm completing each six-row belt.

Cold winter winds in Logan County usually blow from the north and west

, so conifers, cedar, and pine are usually planted in north and west rows to break the wind and trap the snow as soon as possible. Spacing between the trees in the rows was planned to allow adequate room for the trees to grow.

"In starting the windbreak, I took advantage of all the help I could. I ordered trees through a combined Federal and State program, helped pay for the trees with cost-sharing in the agricultural conservation program, and used a soil conservation district (now natural resources district) tree planter to plant them," said Louis.

He went on to say that packing the trees after planting is very important. "We used a row crop tractor and straddled each row with the front wheels," he said while indicating that one of the tractor's front wheels went on one side of the row and the other wheel on the other side of the tree row.

"But care after planting, especially weed control, is the whole key to a successful windbreak. You've got to make up your mind to do it," said Louis.

"The whole family pitched in to do what was needed, Mom (Susie), Connie, Kerri, John, and Craig. If one member of the family couldn't be

working on the windbreak, another one would.

"We took the center sweep off our summer fallowing machine and moved the outside ones in to within about 12 inches from the trees. This tilled a strip up and down each side of each row. We all hand hoed in the rows," said Louis.

"We helped a little bit with irrigation, once right after planting, then early in the spring and again late in the fall for 3 or 4 years. For 2 years we planted hybrid sorghum between the rows as a cover crop as suggested by SCS, even though we were concerned about its use of moisture. Since then, the area between the rows has been mowed each year with a shredder.

"As a sidelight, my son John used his assistance with establishing the windbreak as an activity that helped him earn a Future Farmers of America State farmer degree," said Louis.

"Getting a windbreak in 12 years doesn't take luck," Louis said. "It takes planning and a lot of hard work."

John H. Sautter,
district conservationist,
SCS, Mullen, Nebr.



A windbreak of eastern redcedar, ponderosa pine, and Siberian elm—shown here after 4 years of growth—grew to maturity in only 12 years through personal care by the entire Halstead family.

Surface Mine Reclamation

Conservation Districts Are Making Reclamation Work

In central and western Tennessee, thousands of acres of clay, gravel, sand, and phosphate mined land lays abandoned. "At some phosphate mine sites in Williamson County, mining companies left mounds of dirt as high as 30 feet with gullies 30 feet deep," says Robin Bowie, Soil Conservation Service district conservationist. "Those areas were eyesores and rendered the land worthless."

In 1979, the Tennessee Department of Conservation, Division of Surface Mining, designated the money it had collected for mining permits over the years as funds for reclaiming the abandoned non-coal-mined land. Tennessee soil conservation districts are administering the program, and each participating district received between \$45,000 and \$55,000 the first year.

Bowie is working with the Williamson County Soil Conservation District

(SCD) in selecting potential sites for reclamation work and developing conservation plans. Conservation planning for the sites includes smoothing and shaping, diversion terraces, grassed waterways, and seeding of tall fescue and ladino clover.

"With the reclamation funds from the State, the district hires contractors to smooth and shape the land and install diversion terraces and grassed waterways," says Bowie. "The landowners' part in the reclamation work involves preparing the seedbed and providing the seed, mulch, and fertilizer needed for establishing vegetative cover."

So far, the Williamson SCD has helped landowners reclaim about 50 acres at three sites. One of the sites will be used for recreation and two are planned for use as pasture and hayland. Vegetation establishes itself quickly on the reclaimed phosphate mine sites, and some areas have been planted to soybeans. "Another potential use of the reclaimed land is for outdoor classrooms," says Bowie.



A mining company stockpiles the overburden during phosphate mining at this Williamson County, Tenn., site. The phosphate lies 2 to 10 feet below the surface.

Pine Trees Grown on Reclaimed Mined Land

The Choctaw Materials Company in the southeastern Oklahoma community of Hugo demonstrates that reclamation can work. W. G. McKnight, owner of the company, heard the environmentalist's plea long before ecology became very popular, and before strict mined land reclamation laws were passed.

The company has been in operation for the past 12 years, removing sand and gravel from about 240 acres of company-owned land. In 1972, McKnight met with local Soil Conservation Service employees assisting the Kiamichi Conservation

District to ask for help in developing a reclamation plan for his mined land.

McKnight decided to begin reclamation work on a 110-acre area of previously mined land. Because of the high cost for the work, equipment and operators were borrowed from the company's roadbuilding crew when the weather would not permit them to work on roads.

Once the area was leveled and shaped, lime and fertilizer were applied and a good seedbed was prepared with heavy disks and sprigged to coastal bermudagrass. The area was overseeded with large hop clover. An excellent stand of grass was established and the land was leased to local ranchers for grazing.

However, mining operations and cattle were not compatible, and in 1976, the company again asked for assistance from SCS to help develop an alternative use for reclaimed land.

SCS recommended establishing pine trees, and in the fall of 1976, the company began planting loblolly pine trees.

Growing the pine trees has proven to be compatible with McKnight's mining operation. The trees require little management and will reach marketable size for pulpwood in about 12 years.

Ray Weems, vice-president of the company, says, "The reclamation work was an expensive project, but well worth the price to the company.

Before Tennessee enacted its non-coal-mined land reclamation project, abandoned mine sites like this were common.



After reclamation, this phosphate mined land in Williamson County is producing soybeans and other crops.



If we hadn't done something, that land wouldn't have been worth anything. Now, it has been reclaimed and put to productive use."

The company is presently leveling and smoothing land as mining progresses. The company plans to continue the reclamation work until the entire area is reclaimed.

Clifford W. Frick,
area resource conservationist.
SCS, Hugo, Okla.

District Hosts Mined Land Reclamation Tour

Seven companies are mining coal in eight different surface mines in Haskell County, Okla., and the county

includes about 5,000 acres of abandoned mined land. Concerned about damage to the environment from mining, the Haskell County Conservation District began conducting tours in 1973 of mined land reclamation work.

"Although the tours are open to the public," says Steve Hamilton, Soil Conservation Service district conservationist, "they are mostly aimed at landowners and mine operators currently involved in mining. The main objective of the tours is to tell the landowners and mine operators about the technical assistance the Soil Conservation Service can give them in reclaiming mined-out land."

Participants tour reclamation sites

"I feel that preserving potentially productive land for the use of future generations is foremost," says John T. Beasley, chairperson of the Williamson SCD. "This reclamation program is a lot of work for us, but it is worth it because it's helping to beautify the landscape and make mined land productive again."

"We've been getting up early and going to bed late," says Bowie, referring to SCS employees' and board members' work on the reclamation project. "My satisfaction has come from watching the district board members run the project so successfully. The State provided the funding, but the district board made their own decisions on what to do and how to do it. I'm proud to have been a part of it."

Nancy M. Garlitz,
associate editor, *Soil and Water Conservation News*,
SCS, Washington, D.C.

Photos by Jim Bilyeu, public information officer,
SCS, Nashville, Tenn.

where soil has been moved back into the mine pits and shaped, graded, and seeded. They view the results of drilling seed into the soil, broadcast seeding, and sprigging plants. The tour emphasizes how SCS can help landowners and mine operators plan and apply sound conservation practices on mined land.

Coal operators in the county and the Oklahoma Council of the Soil Conservation Society of America share the expenses of the luncheon and chartered bus for the annual tour.

F. Dwain Phillips,
public information officer,
SCS, Stillwater, Okla.

Cement Company Reclaims Surface-Mined Land for Wildlife

The idea of reclaiming surface-mined land is fairly new in the Texas Panhandle, but the Southwestern Portland Cement Company in Amarillo is helping lead the way. So far, the company has shaped and seeded and installed wildlife and windbreak plantings on 140 acres and plans to reclaim 50 more acres in 1981.

The company stockpiles the topsoil it must remove to expose subsurface layers of high-grade caliche, or calcium carbonate, which it uses in making cement mix. After the caliche is removed, the company fills in the mined pits with excess soil material and then replaces the topsoil. The land is then shaped and seeded in grasses and planted to trees.

Herb Stoner, Soil Conservation Service district conservationist in Amarillo, recalls that in late 1972, the cement company's plant manager, Hugh Barclay, contacted SCS to find

out which grasses he should seed to protect an area of eroding mined land. Working with the Canadian River Soil Conservation District, SCS employees visited the mine site, recommended grass seedings, and helped the company seed an area of mined land in the spring of 1973.

"The process was mostly trial and error," says Stoner. "We started by experimenting with several grasses, and the SCS plant materials center in Knox City, Tex., suggested some grasses for us to try. We succeeded in establishing effective ground cover that first year." The cement company also followed SCS guidelines in shaping the land so the contour would be suitable for planting and controlling runoff.

Stoner says that seeding mixtures of native grasses—blue grama, buffalograss, sideoats grama, and green sprangletop—provide the best cover on the reclaimed land. This year, he says, one-third of the seeding mixture included another native grass, plains bristlegrass. Besides providing good ground cover, it also provides food for

wildlife.

Encouraged by the success of its first reclamation efforts, the cement company decided to expand the project. By spring of 1981, the company expects to have reclaimed 200 acres of mined land for use as wildlife habitat. SCS is providing technical assistance in the planting of Russian-olive, wild plum, and cottonwood trees for windbreaks, snow-breaks, and food and cover for wildlife. The reclaimed sites attract deer, antelope, wild turkey, ducks, quails, and doves. Stoner says the wild weeds and forbs that propagate naturally whenever land is disturbed are also beneficial to wildlife.

The Texas Panhandle Chapter of the National Audubon Society recently awarded the cement company its Citation to Industry Award for the company's reclamation work on surface-mined land to benefit wildlife.

"Southwestern Portland Cement is a small company, and we cannot afford to hire soil scientists, agronomists, or engineers," says Mining Foreman Tommy Vinton. "We have

Surface Mine Reclamation Benefits Many

Bob Sechan, of Butler County, Pa., began surface mining limestone in 1952, before any mine reclamation laws had been enacted in Pennsylvania. When he completed mining on part of his land in the early 1970's, reclamation laws were still not on the books. But Sechan's neighbors wanted him to reclaim his land anyway.

Sechan's mined land was an eyesore to the community and a source of sediment pollution to nearby Slippery Rock Creek. The distance from the bottom of the quarry to the tops of

the spoil piles measured more than 150 feet. Slippery Rock Creek is geologically unique, and neighborhood environmentalists, sportsmen, and elected officials wanted to keep it clean. But Sechan didn't feel obligated to reclaim the mined-out land.

In 1972, he changed his mind. "After a lot of people started complaining," says Sechan, "I thought maybe they were right. Also, I knew that reclaiming the land would probably be more profitable for me." So Sechan signed up as a cooperator with the Butler County Conservation District, and his engineer, William P. Deemer, drew up a master plan for developing the land.

Working through the conservation

district, Soil Conservation Service District Conservationist Byron Breisch is providing technical assistance on the conservation measures being installed. So far, Sechan has installed about 5,000 feet of diversions and a sediment basin to control runoff and sedimentation, and he has graded and shaped 250 acres. He has planted crownvetch and grass legume mixtures on about 150 acres needing critical area treatment.

On 200 acres of Sechan's reclaimed land he built a 300-unit mobile home park. He installed plantings on about 75 acres of the park for recreation use and to help control erosion, and he installed a lake for recreation.

leaned on SCS for that kind of technical assistance, and we value their advice. We follow their guidelines and plant what they recommend."

Ted Kupelian.
writer-editor, Information and Public Affairs, SCS,
Washington, D.C.

Reclamation Makes It Big in Utah

In Utah, Kennecott's opencut copper mine, the world's largest, has been battling erosion on its mined land since 1935. Paul Rokich, Kennecott's environmental specialist at the mine, has lead most of the battle.

Most recently, Rokich's efforts at the mine—which covers most of the Crawford Mountain Range—have involved protecting the soil around a 7,000-acre mine tailing pond from wind erosion, installing rotation grazing on a 10,000-acre site, and making a wildlife preserve on a 100-acre site of a mine tailing pond no longer in use. Besides these projects, Rokich is involved in the overall seeding of mine spoil areas on the mine's 30,000 acres.

Sechan's overall development plan shows such things as an air strip, large recreational lakes surrounded by houses, other residential areas, and light industrial and commercial areas.

Before all Sechan's plans can be accomplished, he has to finish his limestone mining operation. In the meantime, however, he has succeeded in extracting mineral wealth from idle land, providing housing space to families, and helping preserve the quality of Slippery Rock Creek.

Corey Bernat,
public information specialist,
SCS, Harrisburg, Pa.

The Soil Conservation Service is providing technical assistance on these and other reclamation projects at the mine through the Salt Lake Soil Conservation District.

The project at the mine tailing pond involves planting grasses on the 20-to 25-foot-high banks surrounding the pond. Each year, waste material from mining—silts, clays, and acid water used in leaching out metals from the soil—is removed from the pond and used in building up the banks. Each year the additions to the banks are seeded. Plantings of intermediate wheatgrass, tall wheatgrass, Indian ricegrass, and alfalfa have been most successful.

The wildlife preserve has been planted to Russian-olive trees and intermediate wheatgrass, Indian ricegrass, bromegrass, and alfalfa. The area attracts ring-necked pheasant, quail, grouse, rabbits, squirrels, nongame birds, and occasionally a few deer. The soil at the site of the old mine tailing pond retains no measurable toxicity or acidity.

In revegetating the mined land,

some sites have to be seeded from the air because of rough terrain, but most mine spoil sites are disked, smoothed, and seeded with drills. The soil is highly acid in some areas and highly saline in others. SCS and Rokich tested hundreds of different plant materials to find those best suited to the harsh conditions. Now the most widely used plant materials at the mine include Russian-olive and saltcedar shrubs and intermediate wheatgrass, tall wheatgrass, Indian ricegrass, and alfalfa.

Rokich grew up around the Kennecott copper mine, and he watched trees die from pollution from the copper smelter. He says he vowed that someday he would make those mountains green again with grass and shrubs, and that's just what he's doing.

Gaylard Robb,
district conservationist,
SCS, Midvale, Utah.

Judy Crookston,
soil conservation technician,
SCS, Midvale, Utah.



On part of his reclaimed mined land in Butler County, Pa., Bob Sechan has built a 300-unit mobile home park beside a recreation lake.

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Soil Conservation Service
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AGR 101



Meetings

December

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| 1-2 | American Society of Agricultural Engineers, Chicago, Ill. |
| 1-4 | National Farmers Organization, Cincinnati, Ohio |
| 2-4 | Western Forestry and Conservation Association, Victoria, British Columbia, Canada |
| 8-12 | American Geophysical Union, San Francisco, Calif. |

January

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| 11-15 | American Farm Bureau Federation, New Orleans, La. |
| 12-15 | North American Game Breeders and Shooting Preserve Association, Springfield, Ill. |
| 15-16 | National Council of Farmer Cooperatives, Hollywood, Fla. |
| 18-19 | Land and Water Exposition, Des Moines, Iowa |
| 25-28 | National Wool Growers Association, San Antonio, Tex. |

February

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| 1-4 | Land Improvement Contractors of America, San Antonio, Tex. |
| 1-5 | National Association of Conservation Districts, San Francisco, Calif. |
| 9-11 | Southern Forest Institute, Inc., New Orleans, La. |
| 9-13 | Society for Range Management, Tulsa, Okla. |
| 13-16 | American Association of School Administrators, Atlanta, Ga. |
| 15-18 | Agri-Turf Irrigation Exposition and Technical Conference, Salt Lake City, Utah |
| 22-27 | American Society of Photogrammetry, Washington, D.C. |

New Publications

Bioengineering for Land Reclamation and Conservation

by Hugo Schiechtl

Part of this book was originally published in Germany in 1973. This is a translation and revision funded by the Alberta Department of the Environment.

The stated purpose of the book is "to show how the products of scientific and technical research can be integrated with natural materials to obtain effective and economic methods of

protecting, restoring, and improving our environment."

The topics covered include:
1. Technical preparation for bioengineering works: support constructions using dead materials; drainage, gully, and bank protection constructions; protection construction for rock falls; wind protection systems; snow and avalanche protection; and contouring works;
2. Bioengineering methods for earthworks: soil stabilization methods using live materials; methods combining dead and live materials; biotechnical drainage systems; surface protection methods; and supplementary building systems;
3. Waterway (hydro) bioengineering;

4. Plant materials used in bioengineering: selection of plant species according to plant sociological and ecological criteria; suitability of plants according to ease of propagation; and biotechnical suitability of plants;
5. Using bioengineering to its best advantage: the most frequent mistakes made in earthworks and hydro construction; choosing the right methods; and areas with special problems; and
6. The cost of bioengineering.

The hardback book costs \$30 and is published by the University of Alberta Press, Suite 450, Athabasca Hall, Edmonton, Alberta, Canada T6G 2E8.

Recent Soil Surveys Published

by the Soil Conservation Service

California: Modoc County and Placer County.

Georgia: Coweta, Heard, and Troup Counties.

Kansas: Doniphan County.

Kentucky: McLean and Muhlenberg Counties.

New Mexico: Dona Ana County.

Oklahoma: Beckham County.

South Dakota: Stanley County.

Texas: Atascosa County.